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ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

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LIST OF RAE TRANSLATIONS ISSUED DURING THE PERIOD JANUARY 1978 --ETC(U)

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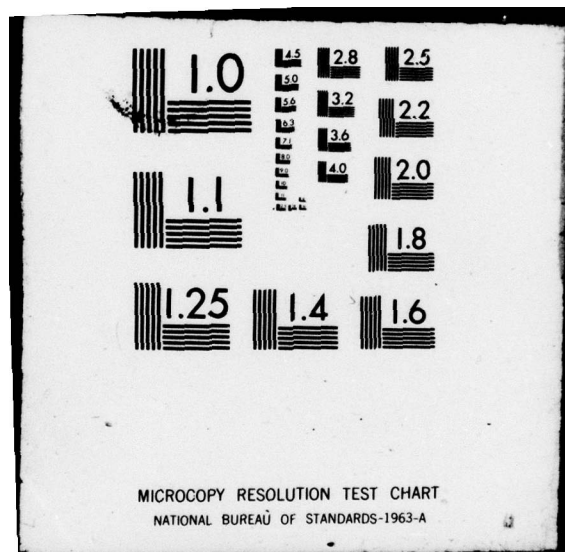
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ROYAL AIRCRAFT ESTABLISHMENT

Library Bibliography 369

Received for printing 26 January 1979

LIST OF RAE TRANSLATIONS ISSUED DURING THE
PERIOD JANUARY 1978 TO DECEMBER 1978

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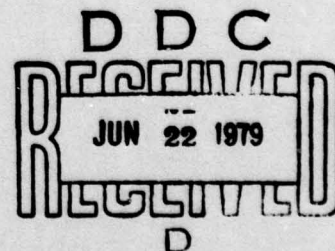
Patricia O. Flint

SUMMARY

This list covers all RAE Library Translations published during 1978 and follows Bibliography 366.

Previous lists have been issued in Bibliographies 243, 249, 254, 261, 283, 313, 319, 324, 330, 353, 360 and 366.

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LIST OF CONTENTS

	<u>Page</u>
LIST OF TRANSLATIONS AND SUMMARIES IN NUMERICAL ORDER	3
AUTHOR INDEX	18

LIST OF TRANSLATIONS AND SUMMARIES IN NUMERICAL ORDER

- 1917 THE VIBRATING ENVIRONMENT IN TRANSPORT VEHICLES. G. Bonnardel
 A CRITICAL BIBLIOGRAPHICAL STUDY B. Favre
 IRT Report No.12, December 1975 J.L. Flores

After a brief review of the theory of vibrations, a physical description of the vibratory and dynamic environment of a vehicle, and more particularly a road vehicle, is given in order to understand the vibratory stimuli to which a passenger is subjected. Special attention is paid to the vehicle suspension and to the seats. The authors then consider the passenger as a mechanical model, exploring how the human body behaves under the effect of vibratory stimuli.

Next, the authors examine what the physiological reactions of a person subjected to such a loading can be, studying which criteria of human tolerance to vibrations have been or are being used and whether they are objective or subjective. In particular, the case of the ISO standard TC-108 (IS 2631) is examined.

Finally, the authors consider the particular case of acceleration and jerk, for which the human tolerance to this type of stimulus is explored.

- 1919 DESIGN AND TESTING OF AN ACTIVE VIBRATION AND FLUTTER H. Hönlinger
 DAMPING SYSTEM FOR EXTERNAL STORES
 Paper read at DGLR Symposium 'CCV Technologies' on 17
 September 1976 at Munich, DGLR 76-241

A system for increasing the flutter speed of a wing with external stores is described. An aerodynamic vane mounted on the store is controlled to add aerodynamic damping to the system. A flight experiment is described and preliminary results given.

- 1923 DETERMINATION OF BENDING STRESSES IN A SPUR GEAR TOOTH Yu.N. Bunakov
 Samoletostroenie i tekhnika vozdušnogo flota 94-96 (1967)

The bending stress of spur gear teeth is estimated assuming it approximates to a cantilever of varying thickness and applying Ritz's variational method for point loading. The stress is determined for a particular case showing the increase near the end of the teeth

- 1928 THE CONDUCT AND EXPERIENCE OF MINERS UNDER THE ACUTE W. Mende
 STRESS OF INCARCERATION A. Ploeger
 Der Nervenarzt, 37, 5, 209-219 (1966)

Eleven miners were imprisoned for 14 days at a depth of 55 m in the pit disaster at Lengede in 1963. For 10 days they had no contact with the outside world whatsoever. Shortly after their rescue they were subjected by us to psychiatric and neurological examinations. The observational data thus obtained are reported here. They provide important indications for the occurrence of psychopathological phenomena (e.g. illusory perceptions), for social behaviour in extreme situations and also for the question of the psychic endurance limit. The significance of these observations lies primarily in the fact that the stress factors in this acute situation can be surveyed clearly and are well documented. A whole group of men was affected by them in a completely identical manner. This was a "natural" extreme situation with characteristics as clear as those of an experiment.

- 1929 LOAD DISTRIBUTION BETWEEN HARMONIC DRIVE TEETH Yu.P. Fuks
Izv. Vyssh. Uchebn. Zaved. Mashinostr, 12, V.A. Finogenov
23-28 (1971)

This paper gives a method for determining the load acting on the teeth of harmonic gears

- 1930 EVALUATION OF THE AMOUNT OF EXPOSURE TO VIBRATIONS Mm. Boulanger
TRANSMITTED TO THE WHOLE BODY. CASE OF VIBRATIONS DUE Mistrot
TO A LOADER MOUNTED ON CATERPILLAR TRACKS, A FORK-LIFT Poirot and Roure
TRUCK AND A HYDRAULIC EXCAVATOR
Institut National de Recherche et de Securite', 1,
Report No.245/RE (Volume 1 - Text, Appendix A
(Volume 2)), October 1976.

Studies were undertaken by the INRS, on three types of vehicles used in steelworks, to measure the amounts of vibration to which their drivers were subjected during a working day.

A comparative analysis was carried out, using either the conditions of Standard E90-400 or the improvements to this recommended by the INRS. There was not complete agreement between the results obtained by the two methods.

Recommendations are made for improving the seats in the vehicles to try to reduce the drivers' exposure to vibrations to acceptable limits.

Finally, suggestions are made for further work by the INRS in this field.

- 1933 SWEDISH DEFENCE RESEARCH ABSTRACTS 76/77-3
Research Institute for National Defence, Stockholm

The Swedish Research Institute for National Defence issues a quarterly list of unclassified Reports published by the Institute. The titles of these Reports and informative abstracts have been translated in English. This volume is the third issue of 1976/77. Further volumes will be translated in due course. The main topics covered are: Protection - atomic, biological, chemical; ammunition and weapons; conduct of war, information and commands; vehicles and spacecraft; reliability and logistics; human factors; associated studies and their solutions; positive methods for limitation and control of armaments; psychology reports.

- 1934 THE COLLECTION AND ANALYSIS OF FATIGUE DAMAGE H. Huth
OCCURRING IN AIRCRAFT IN SERVICE D. Schütz
Laboratorium für Betriebsfestigkeit, Darmstadt,
25 November 1976

In order to create guide lines for the planning of future research projects aimed at improving the fatigue strength of aircraft structures, data on fatigue damage occurring in service and in full scale tests have been collected and analysed.

A total of 529 cracks in 27 different aircraft samples have been covered. These fatigue cracks have been classified, analysed and evaluated statistically to enable evidence on the main weaknesses and causes of damage to be derived therefrom.

1936 CAN ATTENTION BE DIVERTED?
Research Inst. of National Defence
(FOA-2-C-2482-H5), Stockholm, 1971

R. Johansson
A. Jonsson

Problem: If two objects of similar shape but different contrast are searched for in a cluttered environment, (a) how much difference in contrast is needed for the object with the greater contrast to be detected first, and (b) does detection of the first object cause delay in detecting the second object?

Method: Two experiments were carried out with the aid of a tachistoscope. One with the objects placed in a cluttered environment and the other with the objects in a terrain background.

Result: (a) It is possible with a high level of probability, to direct an observer's attention towards the desired objects. (b) A delaying effect can be demonstrated but many other factors are capable of interfering with it.

1939 APPLICATION TO LIFE PREDICTION OF DESIGN DATA DERIVED FROM FATIGUE TESTS WITH SERVICE-LIKE LOAD SEQUENCES D. Schütz
H. Lowak
FB-109(1976), Laboratorium für Betriebsfestigkeit, Darmstadt

Statistically verified life curves were established for a load sequence and cumulative frequency distribution typical of the wing structure of a transport aircraft. It is demonstrated how life curves for other sequences can be predicted from this test data using a Relative Miner rule.

It was found that for large differences between the sequence for which an estimate is to be made and that for which design data is available, use of the Relative Miner rule does not predict life better than the use of usual Miner rule. As differences in the estimated lives based on Relative Miner rule and the corresponding test results could be to a large extent explained by residual stresses, a suitable correction was introduced. The correction was applied to the specimens used in this investigation using empirically derived data, and provided an effective refinement to the Relative Miner rule giving very accurate life predictions.

1940 APPLICATION OF THE DIRECT-CURRENT ELECTRICAL POTENTIAL METHOD IN FRACTURE MECHANICS P. Stratmann
K.H. Bowe
Materialprüfung, 18, No.9, 339-341 (1976)

The determination of the depth of cracks using a direct-current potential-probe method is described. With the help of various technical measurement problems from the field of fracture mechanics, the possibilities and limitations of this method are discussed. Moreover, it is shown how the accuracy of the method may be improved and how the work expenditure associated with such type of measurement can be reduced to a considerable degree by simple automation.

- 1941 EXPERIENCE GAINED IN NON-DESTRUCTIVE TESTING OF HIGH-STRESS STRUCTURAL ELEMENTS USING THE DC-POTENTIAL PROBE METHOD E. Kloth
M. Strasser
Materialprüfung, 17, No.7, 224-225 (1975)

The potential probe method involves the measurement of the electrical field distribution at the surface of components through which current is flowing for purposes of checking cracks and of determining wall thickness. The principles and applications of the method are described in several publications. It is suited, in a way scarcely any other non-destructive technique is, to the detection of cracks reaching the surface of work pieces of complex shape and to the quantitative determination of their depth and position.

- 1942 COMPILATION OF MEASURES TO INCREASE THE FATIGUE STRENGTH OF AIRCRAFT STRUCTURES D. Schütz
J.J. Gerharz
Laboratorium für Betriebsfestigkeit, TB-126 Darmstadt (1975)

This compilation is the result of a literature survey. It is orientated to comprehensively inform the designer and to ease the selection of suitable measures for a fatigue critical structural detail. Together with the description of the measures there are improvement factors presented which should only be used as lead-values.

- 1943 EXPERIMENTAL EVIDENCE OF TWO STRESS CORROSION MECHANISMS IN AN Al-Zn-Mg-Cu ALLOY C. Renon
H. Martinod
La Recherche Aerospatiale, No.3, 179-190 (1977)

The assistance to stress corrosion, in a chloride solution, of a thick sheet of AZ5GU (7075) in the short transverse direction has been coupled with the micrographic aspects of the very first stages of cracking. Observations showed that there are two possible processes for crack initiation, one of purely electrochemical character, the other with a main mechanical component. The predominance of one or other of these initiation mechanisms is only a function of the thermal treatment carried out on the alloy and of the resulting structural precipitation; it does not depend, in the domain under study, on the corrosion conditions; these however have a strong influence on the growth rate of the preferred cracking type in a given state of the alloy.

- 1944 INFLUENCE OF GUST MODELLING ON THE IDENTIFICATION OF THE DERIVATIVES OF THE LONGITUDINAL MOTION OF AN AIRCRAFT Gerd Schulz
DFVLR Institut für Dynamik der Flugsysteme,
Oberpfaffenhofen, DLR-FB 76-63 (1976)

The influence of stochastic modelling of horizontal and vertical gusts on the Maximum Likelihood Identification of derivatives of the longitudinal motion of the HFB-320 aircraft is investigated in this paper. Three different modellings of the power spectral densities of the gusts are considered. It is shown, that the outputs are more influenced than the estimates of the derivatives. The best curve fit occurs for modelling of the power spectral densities of the gust by a first order Gauss-Markoff process.

- 1945 INVESTIGATIONS INTO THE IMPORTANCE OF THE DIRECTION
OF CENTRIFUGAL FORCES ACTING ON THE HUMAN BODY
Luftfahrtmedizin, 1, 307-325 (1937)

L. Bührlen

Using the centrifuge of the Luftfahrtmedizinisches Forschungsinstitut of the RLM in Berlin, centrifugal force tests were carried out on men in sitting and lying positions. The centrifugal force measurement was carried out to an accuracy of within a few per cent by means of the optical recording of the speed of rotation of the centrifuge. In the sitting position (head-seat direction of centrifugal force), the same phenomena were observed as those familiar from flight practice. Prolonged acceleration forces about 5 g led to disturbances of vision.

In the lying position (chest-back direction of centrifugal force), no troublesome disturbances were noted up to 10 g, apart from a slight effect on the breathing; about 10 g, breathing became considerably more laboured and from 15 g upwards, almost impossible. At 14-15 g, disturbances of vision occurred, although the brain and consciousness were in no way affected.

For purposes of flight-practice evaluation, it is proposed that practical tests in aircraft should be carried out using a swivel-type seating system.

- 1946 INVESTIGATION INTO A NOVEL MIXING METHOD FOR VIDEO SIGNALS N. Franke
Rundfunktechn. Mitteilungen, 11, No.4, 196-202 (1967)

Some time ago, a new method for mixing video signals (nonadditive mixing) was introduced in the United States, in which an electronic switch controlled by the instantaneous value of the applied signals, always feeds the strongest signal to the output. In this way, the output signal can never be stronger than the strongest input signal, which is advantageous for use in mixers and faders. After explaining the principle, the author indicates a simple circuit for utilising the new method. On this basis, designs are developed for equipment for the various functions of vision control, such as mixing and fading, special effects and caption inlay, and these are compared, as regards their cost and effect, with equipment of conventional design. Particular attention is given to operation with coded colour signals (FBA chrominance, luminance and blanking, FBAS chrominance, luminance, blanking and sync pulses). The picture impression when mixing and fading with the new method is different from that of the additive mixer. It is possible that elements of the input pictures appear in the mixed picture, whose brightness values and colours are largely unchanged, and this in many cases has a pleasant effect. The author endeavours, by means of some illustrations, to bring out these differences.

- 1947 A NEW POLARIZER CIRCUIT FOR INFLUENCE AND CAPACITOR
MACHINES
Annalen der Physik, 63, 4th series, 295-300 (1920)

H. Wommelsdorf

A 'capacitor machine' similar to a Wimshurst machine is described, for generating high voltages. It is claimed that the capacitor machine shows a markedly better performance than was available from other discharge machines of the day. The capacitor machine may be easily dismantled and could be useful for teaching purposes.

- 1948 TECHNICAL EVALUATION OF FLYING WEAPON SYSTEMS P. Ebeling
BMVg-FBWT 75-29, Part 2, pp 243-272 (1975) W. Germany

The object of this paper is to present some details on the evaluation of military aircraft and missile weapon systems at IABG - WT. This work represents a contribution in support of the Federal German Ministry of Defence. The paper first explains technical evaluation as it is understood in the different phases of weapon systems development and procurement. A brief survey is given of the different methods used in this work. The last part of the paper presents as an example two digital computer programs for design and scaling aircraft and tactical missiles and their possible applications within the technical evaluation of weapon systems.

- 1949 METHODS OF EVALUATING THE EFFECT OF ANTI-AIRCRAFT SHELLS G. Sögtrop
BMVg-FBWT 75-29, Part 2, pp 321-352 (1975) Germany

This report describes the evaluation of ammunition effectiveness against aircraft using a simulation model consisting of three parts:

the target-model
the hit-model
the ammunition effects model

The target-model uses surfaces such as ellipsoids and cones to describe the target external geometry as well as several thousands of components described by location and function. F4 and RF84 aircraft are modelled.

The hit-model determines the shell impact points and conditions from consideration of engagement geometry.

The ammunition effects model describes the shell fragment trajectories and the blast and incendiary effects and by using empirical formulae target component damage is determined. From the effects of component damage on the aircraft, probabilities of aircraft kill can be obtained.

- 1951 RELAXATION METHODS FOR THE SOLUTION OF ELLIPTIC PROBLEMS
IN DOMAINS WITH ARBITRARY BOUNDARIES. APPLICATIONS TO
COMPUTATION OF SUBCRITICAL FLOWS M. Fenain
Journal de Mécanique Appliquée, Vol 1, No.1 (1977)

Relaxation methods are applied to the numerical solution of elliptic partial differential equations in single or multiple-connected domains with arbitrary boundaries. A simple and convenient technique of 'correction of the coefficients' yields a normalized scheme for the treatment of all the mesh-points, regardless of their proximity to the boundary and also of the type of boundary condition, whether of Dirichlet, Neumann or related type.

Applications, pertinent to subcritical flows, are presented essentially in order to point out the details of the procedure and of its exploitation. In particular, nonlinear fundamental equations are treated artificially as linear non-homogeneous equations with an evolutive right-hand side.

- 1952 HUMAN ENGINEERING EVALUATION OF A MAN-MACHINE SYSTEM
FOR SYSTEM OPTIMIZATION - ILLUSTRATED BY A COCKPIT
EVALUATION
MBB Report UFE 1351 (Ö), 9 September 1977

H. Denkscherz

The procedure of evaluation of a man-machine system in terms of human engineering is described, using the example of a cockpit development. Subjects of evaluation are operator performance, hardware, software and operating procedures. The evaluation situation is represented by a cockpit simulator. Evaluation data are acquired by observing and questioning the operators. The object of the evaluation is system optimization.

- 1954 STRESS-CORROSION OF THICK ALUMINIUM PLATES, METHOD OF
TEST BY FRENCH INDUSTRIAL LABORATORIES
Métaux Corrosion-Industrie, 615, 375-387 (1976)

M. Reboul
J.-P. Pouget
Mme S. Pinochet

There is not, in France, a standard method for testing the stress corrosion behaviour of aluminium alloys, such as the high-strength 2000 (Al-Cu) and 7000 (Al-Zn-Mg-Cu) series which are sensitive to stress corrosion.

Collaborative tests between some industrial French laboratories have led to agreement to recommend the method summarised below:-

- (a) Specimens taken in the short transverse direction: 4 mm diameter, length 25 mm;
- (b) Machine-finish VV - pickled in nitric/hydrofluoric acid;
- (c) Put under tension (5 specimens per stress): 75, 50 and 30% of 0.2% PS;
- (d) The stress is applied by a constant load bend rig (accuracy better than 5%);
- (e) Alternate immersion in 3.5: NaCl solution, immersed 10-15 minutes per hour, 24 hours a day for 30 days;
- (f) Results (life) are expressed in days; one can also use a criterion proposed by Alcoa:
 - A No failure at 75% of 0.2% PS
 - B Failure at 75%, no failure at 50% of 0.2% PS
 - C Failure at 50%, no failure at 30% of 0.2% PS
 - D Failure at 30% of 0.2% PS.

- 1955 THE MAXIMUM SENSITIVITY OF WHEATSTONE BRIDGES OPERATING
ON ALTERNATING CURRENT
Revue Générale de l'Electricité, 74, No.4, 305-316 (1965)

A.Th. Popesco

The author shows that certain contradictions observed where the sensitivity of Wheatstone bridges operating by alternating current is concerned, result from confusion which arose at the beginning in the calculation of the complex impedance values maximising the modulus of the relative sensitivity of ac bridges. He presents a method of graphical calculation which makes possible the exact determination of the minimum value of a function of complex variables of the type used by Lord Rayleigh. A numerical example illustrates these theoretical considerations and demonstrates their accuracy.

- 1956 MICROWAVE SCATTERING FROM THE SEA SURFACE Volker Stein
DFVLR Institut für Flugfunk und Mikrowellen
Oberpfaffenhofen, DLR-FB 77-09 (1977)

Ocean surface models used to describe the scattering of microwave energy are reviewed and classified. The scatter cross-section per unit area is derived and developed in detail for the important facet model for composite surfaces. The model is expanded to incorporate the hydrodynamic interaction between winds and waves, in particular the asymmetry of leeward and windward scattering. A model of a slightly rough surface which is the basis for the composite model is described, incorporating random and periodic characteristics. Approximate boundary value solutions for ideally conductive, time invariant, finite and infinite oceans are extended to include depolarization effects and the effects of a dissipative time varying surface. The limitations on the models described are considered.

- 1957 THE LINEAR STABILITY OF THE GLASS CERAMIC ZERODUR G. Exner
Lecture given at the 76th Conference of the German Society
of Applied Optics, 22 May 1975 at Bad Ischl

The transparent glass ceramic Zerodur is in fact mainly used in reflecting optics; its extremely small thermal expansion (a typical value may be $\alpha = 0.4 \times 10^{-7}/K$ between 0° and $50^\circ C$) is, however, of importance where its use as a construction material in precision engineering is concerned.

In this connection, measurements of the linear stability over a period of years are often necessary. A report is given of results of measurements of this small (shrinkage) effect (order of magnitude $10^{-7}/\text{year}$) and its dependence on the previous thermal history; predictions of the future behaviour are also discussed.

- 1958 SWEDISH DEFENCE RESEARCH ABSTRACTS 76/77-4
Research Institute for National Defence, Stockholm

The Swedish Research Institute for National Defence issues a quarterly list of unclassified Reports published by the Institute. The titles of these Reports and informative abstracts have been translated in English. This volume is the fourth issue of 1976/77. Further volumes will be translated in due course. The main topics covered are: Protection - atomic, biological, chemical; ammunition and weapons; conduct of war, information and commands; vehicles and spacecraft; reliability and logistics; human factors; associated studies and their solutions; positive methods for limitation and control of armaments; psychology reports.

- 1959 BOUNDARY AND INITIAL CONDITIONS FOR MATRICES USED FOR LOAD SEQUENCE GENERATION H.G. Köbler
Laboratorium für Betriebsfestigkeit, Darmstadt (1977) R. Fischer

The computerized synthesis of a sequence of peaks and troughs from a matrix-scheme is a suitable method in order to generate pseudo-random load-time histories for fatigue testing. The matrix-elements containing the frequencies of transitions between subsequent peaks and troughs will generally result from an analysis of a service load record. If a load-time history of Gaussian type is required, the matrix-contents can be calculated by a mathematical term. The handling of a transition matrix as necessary to generate a sequence of peaks and troughs is done in a manner of lotting. There are two different principles to note: the lotting without or with restoration of lots. Nowadays the latter principle is preferred. In practice, sequences of pseudo-random numbers are used. In order to assure the complete realization of the transition frequencies required and its reliable reproducibility some particularities have to be observed, which are illustrated by elementary examples.

- 1960 ON THE LIMITS OF STEEP HELICOPTER APPROACHES
MBB-UD-101-73 (May 1973) Germany

M. Rade

The flight conditions and limitations influencing steep helicopter approaches are described, the limits for steep instrument approaches stated, and actual flight results are indicated. An approach angle of 15° shows considerable advantages over a normal ILS approach. A few essential conditions for steep instrument approaches are briefly introduced.

- 1961 MEASUREMENT OF THE COUPLING IMPEDANCE AND CROSS-TALK
BETWEEN COAXIAL CONDUCTORS
Kraft och ljus, 3, 68-73 (1964) Sweden

L. Halme

The measurement of the coupling impedance of coaxial conductors is described, and results presented for different outer cover designs. The relationship between the coupling impedance and cross-talk between conductors is discussed.

- 1962 THE MEASUREMENT OF ELECTRICAL AND MECHANICAL SCREENING
OF CABLES AT HIGH FREQUENCIES
Technical Report No.41 Heinrich-Hertz-Institut für
Schwingungsforschung Berlin-Charlottenburg (1960)

Heinz Jungfer

In the past, transfer impedance has been regarded as an acceptable measure of the effectiveness of cable screening. However, only the induced voltage generated by the current and magnetic field is detected. Recent measurements appear to indicate that, in certain cases, the electrical field can also make a significant contribution to the induced voltage. Because of the complex structure of the screening in almost every practical case, it is impossible to make any theoretical assessment of this factor. Relationships have therefore been derived to allow the measurement of either the complete transmitted power or its separate components from magnetic coupling, identified by transfer impedance, and electrical coupling, identified by transfer admittance.

- 1963 A METHOD FOR THE EXACT DETERMINATION OF NOISE
PARAMETERS OF ACTIVE TWOPORTS IN THE FREQUENCY
RANGE 1 GHz TO 11 GHz
Nachrichtentech. Z. 29, No.5, 385-389 (1976)

Christos Tsironis
Heinz Beneking

A simplified measuring procedure using a computer is demonstrated that allows the determination of the four noise parameters of linear active twoports at microwave frequencies. The usual ON-OFF noise measurement procedures in the GHz range (Y-factor method) are modified so that the change in generator impedance between the ON and OFF states does not influence the final result. Additionally, the proposed method does not need any determination of the receiver stage noise properties. Some noise parameters of $1.5 \mu\text{m}$ - Gate MeSFETs are given in the frequency range 2 GHz to 10 GHz as an example.

- 1966 THE CORROSIVE ACTIVITY OF RUBBERS AND COMPOUNDS
BASED ON THEM
Kauchuk i Rezina, 5 pp 19-24 (1977)

A.K. Smolich
A.L. Labutin

The author reviews the literature published during the last 25 years on the corrosion of metals in contact with rubber, its causes, assessment and means of combating it.

Metals can be attacked by, (1) impurities such as catalyst residues from polymerisation, (2) the products of chemical breakdown of the polymer during processing, subsequent storage, or in service or (3) compounding ingredients, antioxidants, fillers etc.

Tests to predict 'in service' behaviour are usually made at high humidity and elevated temperatures. Various methods are used to assess the results.

Means of reducing corrosion include purification of the base polymer, the inclusion of acid acceptors in the vulcanisate, post cure to remove harmful volatiles, applying a protective coating to the metal and control of environmental conditions.

- 1967 ALTERNATING TENSION-COMPRESSION FATIGUE STRENGTH AND
PROPERTY CHANGES OF STEEL AFTER COLD DEFORMATION AT
DIFFERENT DEFORMATION RATES H.R. Sander
M. Hempel
Archiv für das Eisenhüttenwesen, 23 7/8, 290-320 (1952)

The effect of pre-strain and the pre-straining deformation rate on the tensile and fatigue properties of a soft iron, a 0.4% C steel, a 19 Cr/7 Ni metastable austenitic steel and a 15 Cr/27 Ni stable austenitic steel have been investigated.

The yield stress, tensile strength and fatigue properties of the soft iron, the 0.4% C steel and the metastable austenitic steel were increased with the degree of pre-strain. For the soft iron and the 0.4% C steel a high deformation rate was found to be beneficial whereas the opposite was true for the metastable austenitic steel. The strength of the stable austenitic steel was increased with the degree of pre-strain but was independent of the deformation rate; the fatigue properties of this material were independent of both the degree of pre-strain and deformation rate. Reasons for the different behaviour of these materials have been studied and are discussed.

- 1968 THE 'RIAR' SYSTEM, A NEW TELECOMMUNICATION SYSTEM
HIGH-ALTITUDE, ARTIFICIALLY-IONISED REGIONS. POSSIBLE
EXTENSION TO VHF, UHF AND SHF TELECOMMUNICATION A.L. Rorive
Revue Officielle de la Fédération des Ingénieurs des
Télécommunications de la Communauté Européenne, No.4,
July-August 1976

The author presents a new system for the transmission and diffusion of VHF and UHF electromagnetic waves, called the 'RIAR System' (artificially ionised reflector); which makes possible a considerable increase in the heritage of telecommunication systems within the framework of established allocations, without any modifications to individual receiver equipment available on the world-wide market.

The RIAR System is based on the use of a method of operation using unconfined plasma in the high atmosphere coupled with the special properties of coherent radiation whilst retaining developments of present day techniques for transmission installations.

An example is given for the application of the RIAR System to television, sound radio and point-to-point transmission in the European zone of Region 1 of the Radiocommunications Control.

- 1969 EXAMINATION OF THE MECHANICAL PROPERTIES OF PRODUCTS
OF TITANIUM ALLOYS OBTAINED BY AN ORIGINAL HOT-WORKING
TECHNIQUE
Mémoires Scientifiques Revue Métallurgie, January 1977

B.de Gelas
M. Armand
R. Tricot

An original technique of hot-working titanium alloys in the β -field has been studied. It is characterised by the rapidity of its operation, intended to suppress or minimise the unfavourable effect of the recrystallisation of the β -grains. The products obtained by forging have been characterised by their macro- and microstructures, also by their mechanical properties such as tensile strength, toughness and fatigue strength. Results indicate that it should be possible, on an industrial scale, to obtain a set of mechanical properties comparable with those achieved by conventional techniques, using rapid deformation procedures such as rolling or extrusion. Moreover, the study offers a contribution to the problem of forging and heat treatment in the β -field of die-forged titanium alloy components.

- 1970 THE IDENTIFICATION OF A SOURCE OF NOISE AND THE
MEASUREMENT OF ITS EFFECT BY A CORRELATION METHOD
Revue d'Acoustique, No.34, 8-20 (1975)

D. Audoynaud
A. Hellion
B. Escudie

This paper considers the problem of identifying the position and characteristics of distant noise sources by methods based on signal analysis.

After a general analytic discussion of the properties of random functions and correlation functions, the application of correlation techniques to the location of both narrowband and broadband sources is verified experimentally. An experimental noise-location device used for investigating the noise emitted from an oil refinery is described; it consists of a two-microphone 'telescope' and correlator, and results with narrowband and wideband sources are presented.

It is concluded that: a direction finding device operating on a correlation principle is feasible and can be made portable; out of doors, atmospheric propagation effects limit the precision and reliability of measurements taken more than a few tens of metres from the source; angular resolution may be insufficient to separate multiple sources of sound on industrial sites.

- 1971 COMPARATIVE EXPERIMENTS ON PERFORMANCE AND FATIGUE
EFFECTS ON PILOTS USING TRACKING TESTS AND
PHYSIOLOGICAL MEASUREMENT PARAMETERS
21st International Congress on Aviation and
Space Medicine, Munich, West Germany, 17-21
September 1973, pp 237-238

H. Strasser
K.-P. Klinger
W. Müller-Limmroth
G. Brilling

Trials on a pursuit tracking test with simple position control and four reference inputs were carried out initially on ten male industrial employees aged between 40 and 65. They performed two runs of four tests. Physiological parameters were also measured during testing, namely heart beat frequency, a measure of irregular heart beat, and evoked potentials (a parameter of the central nervous system). Performance was valued in terms of the number of errors per unit time. Expected learning curves were produced, but during the adaptive tests the rate of learning increased with time. Two runs of the same tests with the same physiological parameters being measured were then performed by a group of nine navy pilots aged 25 to 36, run I without alcohol, run II with 0.6‰ alcohol. They showed quicker adaptation and faster reactions than the older industrial subjects. Both groups gave similar characteristic pulse rate and heart irregularity profiles, although the pulse rates of the pilots were finally higher than those of

the group of older subjects. Considering the evoked potentials as an indicator of the level of vigilance, both groups showed a drop in this parameter during testing caused by tiredness. A further lowering of vigilance level caused by small quantities of alcohol (pilot group, run II) could be detected.

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| 1972 | APPLICATION OF THE E.G. BROADBENT SCHEME TO TWO-DIMENSIONAL FLOW WITH WATER VAPOUR CONDENSATION IN A LAVAL NOZZLE | Magdalena Bratos
Bożena Drzazgowska |
| | Rozprawy Inżynierskie, 22, 4, 645-653 (1974) | |

The paper uses the E.G. Broadbent numerical scheme to find the solution to two-dimensional flow of condensing water vapour in a Laval nozzle. The possibility is discussed of using the E.G. Broadbent scheme not only for solutions for diabatic flows but also for the construction of a model for condensation (nucleation and growth of droplets) best matching theory with experiment.

- 1975 SWEDISH DEFENCE RESEARCH ABSTRACTS 77/78-1
Research Institute for National Defence, Stockholm

The Swedish Research Institute for National Defence issues a quarterly list of unclassified reports published by the Institute. The titles of these reports and informative abstracts have been translated into English. This volume is the first issue of 1977/78. Further volumes will be translated in due course. The main topics covered are: protection - atomic, biological, chemical; ammunition and weapons; conduct of war, information and commands; vehicles and spacecraft; reliability and logistics; human factors; associated studies and their solutions; positive methods for limitation and control of armaments; psychology reports.

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| 1976 | THE PHYSIOLOGICAL SIGNIFICANCE OF LIGHT FOR HUMAN BEINGS
Lichttechnik, 27, 10, pp 388-394 (1975) | F. Hollwich
B. Dieckhues
C.O. Meiners |
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Over the many thousands of years of its development, the human eye has completely adapted itself to natural daylight. Artificial lighting, however, to which many of us are exposed for the major part of the day, differs from natural daylight as regards spectral composition, intensity and monotony.

This paper discusses the physiological effects of artificial lighting on man on the basis of experimental and clinical investigations on humans and animals.

- 1977 INVESTIGATION INTO THE EFFECT OF RESIDUAL STRESSES ON
FATIGUE STRENGTH AND MEASUREMENT OF RESIDUAL STRESS,
WITH SPECIAL REFERENCE TO AIRCRAFT CONSTRUCTION P. Schrader
BMVG-FBWT, 77-23, pp 1-62 (1977) W. Schütz

Methods of improving fatigue life by induced residual compressive stresses have been critically appraised. Three promising techniques to improve fatigue life were investigated: ring and pad stress coining, shot peening and surface rolling. The techniques were first optimised under constant amplitude loading by systematically varying the most relevant parameter of inducing residual compressive stresses. The optimum parameter was then tested under realistic loads: a flight by flight or random sequence. Three high strength materials, Ti6-6-2, Al-Zn MgCuAg and a maraging steel, were tested in the form of an open hole, plane bending and a fillet specimen. Attempts were made to measure the residual stresses induced by each method using strain gauges.

It was concluded that large improvements in fatigue life are possible even under realistic stresses and sequences, using shot peening, coining and surface rolling. The improvements in life cannot be explained by residual stresses alone, at least for the aluminium alloy. Finally it is shown that even titanium alloys can be successfully coined and even a very high strength steel can be successfully surface rolled.

- 1978 EXPERIMENTAL DERIVATION OF THE EQUIVALENT CIRCUIT AND
PARAMETERS OF AN IDEALISED SYNCHRONOUS MACHINE M. Canay
Bulletin de l'Association Suisse des Electriciens,
63, 20, pp 1137-1146 (1972)

To determine the size of the protection devices required for the exciter circuit of a synchronous machine it is necessary to measure the currents and voltages in the field circuit using dynamic processes. To obtain realistic magnitudes, the mathematical model should include not only the stator, but also the field and damping circuits. After explaining this, a method is given to derive the parameters of a mathematical model of an idealised synchronous machine.

- 1979 PSYCHOLOGICAL ASPECTS OF THE HUMAN-OPERATOR'S ACTIVITY
WHILE TRACKING M.A. Kremen'
Voprosy Psikhologii, 6, pp 70-77 (1977)

This paper proves the importance of studying the problem of tracking. A conclusion is substantiated about the regulatory role of the dynamic image of processes (objects) when forming control movements in tracking operations. Some concepts are introduced by the author which reflect specific characteristics of the dynamic image. A general substantiation and formulation is given of the concept of formation and decay of the dynamic image. Some essential characteristics of the formulation and decay of the dynamic image are revealed in case of multi-dimensional tracking.

- 1980 THE INFLUENCE OF MECHANICAL VIBRATION AND NOISE ON THE H. Dupuis
PERIPHERAL BLOOD CIRCULATION AT SKIN LEVEL A. Weichenrieder
Max-Planck-Institut für Landarbeit und Landtechnik, Bad
Kreuznach. Presented at the 17th Annual Conference of
the Deutsche Gesellschaft für Arbeitsmedizin e. V., Kiel,
5 to 7 May 1977

Hand operated power tools (e.g. electric drills, compressed air tools, power saws) generally produce both noise and mechanical vibration. For a long time 'illness caused by vibration from working with pneumatic tools and tools or machines of a similar nature' has been recognised as occupational injury (No.2103). Since 1 January 1977 'circulatory trouble in the hands caused by vibration which has led to incapacity whether caused or exacerbated by the vibration' has also been regarded as an occupational injury. (No.2104 Amendment 7 to the Occupational Injury Order 1976.) Klosterkoetter (1976) described the latter pathological deterioration resulting from the long term use of such equipment as a 'vibratory quasi-spastic syndrome'. The object of the following experiment was to determine the type and magnitude of acute, measurable circulatory changes caused by the separate and concurrent application of mechanical vibration and noise.

- 1982 NEAR FIELD PROBLEMS WITH HIGH POWER TRANSMITTERS Joachim Kaiser
 Rundfunk-Technische Mitteilungen, 19, 1, 23-30 (1975)

In the area close to the aerial of high-power transmitters, disturbing effects of the interaction of the electromagnetic field with parasitic radiators may occur. On the one hand, close coupling between the transmitting aerial and parasitic radiators may give rise to an impairment of the radiation pattern of the aerial. On the other hand, high induced RF voltages and currents may occur on electrically-conducting parts of buildings in the radiation field (for example, parts of industrial installations, overhead lines, rain-water gutters, lightning conductors).

Induced RF voltages occurring at gaps in the conductors can nearly always be prevented in fixed structures by means of suitable structural precautions. On the other hand, however, this is not always possible in the case of moving objects, such as cranes, dredgers and the like, but by suitable technical precautions, a reduction of the RF voltages to harmless levels is in most cases possible.

- 1983 THE DETERMINATION OF THE STABILITY OF STRUCTURES OF L.G. Belozarov
 COMPOSITE MATERIALS SUBJECTED TO INTENSE SURFACE V.A. Kireev
 HEATING
 Mekhanika Polimerov, No.3, pp 551-553 (1977)

The effect of destructive heating applied to the surface of a cylindrical shell of composite material subjected to compressive end loads or uniform external pressure is considered theoretically, and the results compared with those of previously reported experiments by the same authors.

The reduction in the value of critical load which occurs with increasing exposure time is considered in terms of the reducing structurally effective thickness of the wall.

- 1984 NOISE ANALYSIS FOR EARLY FAILURE DETECTION IN Dieter Barschdorff
 FIXED INSTALLATION TURBOMACHINES AS A PROBLEM Wolfgang Hensle
 OF PATTERN RECOGNITION Bernhard Stuehlen
 Technisches Messen, 44, Part 5, pp 181-189 (1977)

Power plants have grown to 1100 and 1300 MW within the last years. The unexpected breakdown of such large units may cause blackouts in great areas. Condition monitoring of turbomachines today is maintained by observing mechanical and thermodynamical parameters.

The adapted methods of pattern recognition are able to supply additional information on machine performance and therefore to support preventive failure detection. In this investigation some new methods of adapted techniques of measurement and signal analysis are discussed. Good results were obtained in the experimental field. The application on turbines in power plants is now investigated.

1986 OPTOMETER FOR THE RECORDING OF ACCOMMODATION
MICROFLUCTUATIONS
Vision Res. 17, pp 1115-1124 (1977)

Pierre Denieul
Jacques Simon

An infra-red optometer has been developed for the dynamic recording of microfluctuations of the human eye accommodation. The measurement principle consists of optical quality analysis after double traverse of the eye (optical modulation factor). The apparatus enables measurements in natural conditions for the eye (pupil area covered and visual field sufficiently free to allow binocular vision of the fixation target).

Ametropia of $\pm 10D$ and astigmatism can be tested. With an artificial eye, the detectivity (for the bandwidth 0-4 Hz and a linear range of 1.5D) is 5/1000D with a 5 mm pupil diameter and 2/100D with a 3 mm pupil diameter.

With the human eye, similar performances can be obtained and artefacts can be detected with another photometric path. Microfluctuation records are given for two different situations.

1987 PROXIMITY FUZE SIMULATION RIG USING MODELS
AEG-Telefunken FT9/78, January 1978

W. Jacobi

This report describes the AEG-Telefunken radio modelling facility for proximity fuze simulation. It was produced on behalf on the German Government in response to a cooperative programme on fuze technology under the auspices of NATO, AC243, Panel X, RSG2, WG3.

AUTHOR INDEX

M. Armand	1969	S. Pinochet	1954
D. Audouyraud	1970	A. Ploeger	1928
D. Barschdorff	1984	Poirot	1930
L.G. Belozerov	1983	A.Th. Popesco	1955
H. Beneking	1963	J.-P. Pouget	1954
G. Bonnardel	1917	M. Rade	1960
Boulanger	1930	M. Reboul	1954
K.H. Bowe	1940	C. Renon	1943
M. Bratos	1972		
G. Brilling	1971	Research Institute	{ 1933
L. Bührle	1945	for National Defence	{ 1958
Y.N. Bunakov	1923	Stockholm	{ 1975
M. Canay	1978		
P. Denieul	1986	A.L. Rorive	1968
H. Denkscherz	1952	Roure	1930
B. Dieckhues	1976	H.R. Sander	1967
B. Drzazgowska	1972	P. Schrader	1977
H. Dupuis	1980	G. Schulz	1944
P. Ebeling	1948		
B. Escudie	1970		
G. Exner	1956	D. Schütz	{ 1934
B. Favre	1917		{ 1939
M. Fenain	1951		{ 1942
V.A. Finogenov	1929	W. Schütz	1977
R. Fisher	1959	J. Simon	1986
J.L. Flores	1917	A.K. Smolich	1966
N. Franke	1946	V. Stein	1956
Y.P. Fuks	1929	H. Strasser	1971
B. e Gelas	1969	M. Strasser	1941
J.J. Gerharz	1942	P. Stratmann	1940
L. Halme	1961	B. Stuehlen	1984
A. Hellion	1970	G. Stüdtrop	1949
M. Hempel	1967	R. Tricot	1969
W. Hensle	1984	C. Tsironis	1963
F. Hollwich	1976	A. Weichenrieder	1980
H. Hönlinger	1919	H. Wommelsdorf	1947
H. Huth	1934		
W. Jacobi	1987		
R. Johansson	1936		
A. Jonsson	1936		
H. Jungfer	1962		
J. Kaiser	1982		
V.A. Kireev	1983		
K.P. Klinger	1971		
E. Kloth	1941		
H.G. Köbler	1959		
M.A. Kremen	1979		
A.L. Labutin	1966		
H. Lowak	1939		
H. Martinod	1943		
C.O. Meiners	1976		
W. Mende	1928		
Mistrot	1930		
W. Müller-Limmroth	1971		